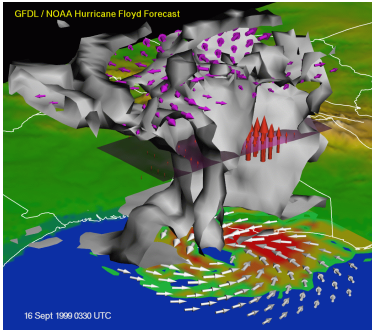


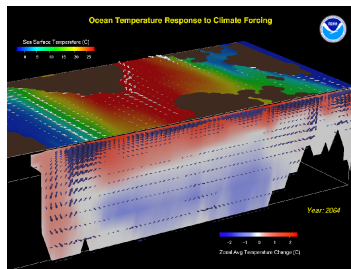


Geophysical Fluid Dynamics Laboratory

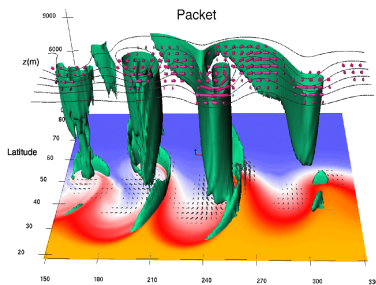
Modeling the earth's climate and weather



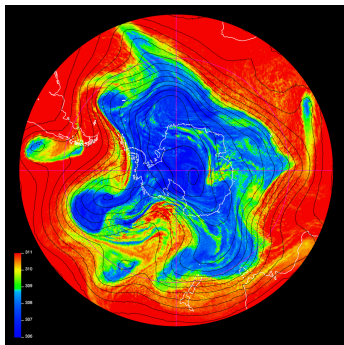
Forecasting Hurricane Floyd



Ocean Thermal Response to Climate Forcing



"Packet" Structure in Storm Tracks



High Altitude Atmospheric Mixing

1315 East West Hwy
Silver Spring, MD 20910
301-713-1671
www.oar.noaa.gov

What does the Geophysical Fluid Dynamics Laboratory do?

The Geophysical Fluid Dynamics Laboratory uses mathematical models and computer simulations to predict the behavior of the atmosphere, the oceans, and the climate system.

GFDL has focused not only on model-building relevant to hurricane modeling, but also on creating and using complex computer applications to carry out state-of-the-art supercomputer and data storage models have become key tools, not only to predict the physical processes that control the earth's climate, as the earth's climate, years into the future. Over its 45-year history, GFDL has set the agenda for much of the world's research on climate change, and has played a significant role in WMO and IPCC assessments. Many of the key scientific issues in the area of the key scientific papers published by GFDL.

Research at GFDL, based on model studies, has also resulted in a host of insights into oceanic processes, ranging over such problems as storm tracks, the stratospheric circulation, atmospheric response to the Niño-Southern Oscillation (ENSO), convection-cloud-radiation feedbacks, global thermohaline circulation, and global thermohaline circulation, and strongly felt within GFDL that this broad set of activities leads to more accurate prediction of phenomena in the atmosphere, the ocean, and the cryosphere, on daily, seasonal, decadal or centennial time scales.

Recent Accomplishments

- " The Modular Ocean Model, affectionately known as MOM, is used within GFDL for climate modeling and seasonal-to-interannual (SI) variability and is used within GFDL (in collaboration with Princeton University) modeling of the carbon cycle. ***been publicly available for a decade and is used by a large number of the researchers worldwide working with global climate models, and is operationally used by the Climate Prediction Center of NCEP. It has been configured for use by a consortium of groups (GFDL, IRI, NOAA, COLA, and NCAR) for coordinated research on SI predictability.***
- " GFDL has developed a hurricane prediction system that has improved predictions of hurricane and typhoon tracks. Recent work on intensity prediction with a coupled atmosphere-ocean model is also very promising. The story of this model's development can be found in the GFDL's research style – a model meticulously developed for research into hurricane dynamics evolves into a valuable operational tool. ***Payoffs: The GFDL hurricane model has been adopted by NCEP and the U.S. Navy for operational use.***
- " In 1995, GFDL began development of the first ever Flexible Modeling System (FMS) that is designed to create a modeling system that can be used for a wide range of applications.

aa wide variety of specialia wide variety of specialized atmoa wide variety of specialized atmospheric and o
 innoinnovationinnovation is now demonstrating a sharply improved ability to prepare models, greater ease of in
 andand an increased efficiency in utilizationand an increased efficiency in utilization of scarce scientific talent. and
**newnew researchers worldwide who are workingnew researchers worldwide who are working cooperative
 next generation of NOAA s weather and climate prediction models.**

- " GFDLGFDL has made major contributions to the 2000 Intergovernmental Panel on Climate Change (IPCC) ClimateChange Assessment. The IPCC is an international process designed to produce objective assessmentsassessments ofassessments of the state of scientificassessments of the state of scientific understa
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**authorsauthors to the assessment report andauthors to the assessment report and provided many newa
 of the earth s climate system.**

What s next for GFDL?

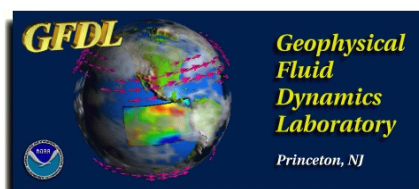
- " IntegratingIntegrating the new massively parallel supercomputer system intIntegrating the new massiv
 optimizing major models to make best use of the new system s capabilities.
- " ModifyingModifying the Hurricane model to improve use of newModifying the Hurricane model to improve use of n
 vicinity.
- " ContinueContinue improvingContinue improving the FMS system, increasing its robustness to multipleContinue
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 efficiently on massively parallel computers.
- " FocusingFocusing research on climate change detection/attribution, and assessing theFocusing research on clim
 vvarvariabilityvariability and anthropogenic causes in dimate change. This work is critical for evaluating t
 credibilitycredibility of mathematical modelscredibility of mathematical models forcredibility of mathematical mod
 the earth s ecosystems will be affected by such changes.

Research Partnerships:

GFDLGFDL has research partnerGFDL has research partnerships with GFDL has research partnerships with a
 severalseveral hundred active collaborations. Within NOAA, it has active research programs withseveral hundre
 laboratorieslaboratories and NWS/NCEP. Within the felaboratories and NWS/NCEP. Within the federlaboratori
 NSF/UCAR,NSF/UCAR, NASA, NSF/UCAR, NASA, and DOE, among others. GFDL has a cooperative agree
 AtmosphericAtmospheric and OceanicAtmospheric and Oceanic Sciences ProgramAtmospheric and Oceanic Scienc
 withwith research institutions overseas. A complete listing of GFDL swith research institutions overseas. A complete l
 at the GFDL website.

Budget and Staff:

GFDLGFDL is a \$22 million laboratory (\$12.8 million in NOAA baseGFDL is a \$22 million laboratory (\$12.8 millio
 employees and 12 university visiting scientists and graduate students.



For more information, contact:

Dr. Ants Leetmaa, Director
 P.O. Box 308
 Princeton University
 Princeton, NJ 08452
 Phone: (609) 452-6502
<http://www.gfdl.noaa.gov>